

# ZONOLITE INSULATING CONCRETE FLOORS



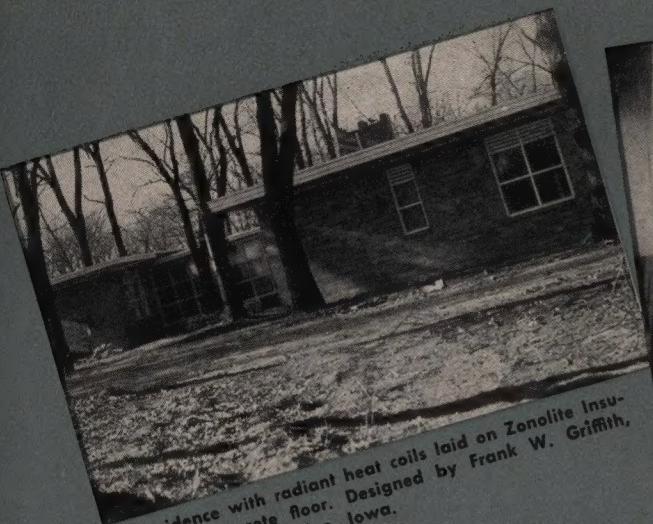
- Radiant heat floors
- Floors on ground
- Floors above ground
- Upper story floors
- Basement floors



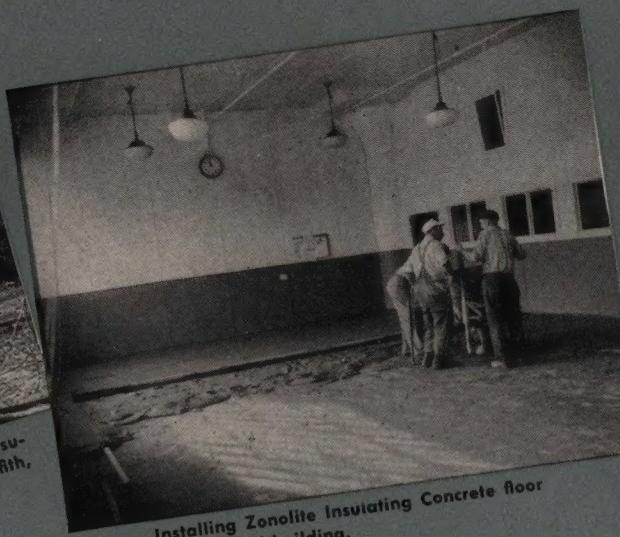
Permanent as the Earth Itself

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# ZONOLITE INSULATION



Residence with radiant heat coils laid on Zonolite Insulating Concrete floor. Designed by Frank W. Griffith, Architect, Fort Dodge, Iowa.



Installing Zonolite Insulating Concrete floor in industrial building.



Radiant heat coils resting on

## FLOORS THAT INSULATE

It is no longer necessary to tolerate cold, damp, grade level floors in the winter time in either homes or commercial structures. The development of Zonolite Insulating Concrete has made it possible to eliminate this problem. This efficient insulating concrete floor reduces heat losses downward into the cold ground.

When radiant heating is specified, these floors are particularly desirable as a base for the coils or ducts. After laying the coils on this highly efficient and permanent insulating base, they should then be covered with ordinary concrete. Heat waste into the ground is greatly reduced enabling the room to heat faster.

Whenever a floor is constructed on grade level, regardless of whether or not it has radiant heat, Zonolite Insulating Concrete should be specified. On hot, humid days condensation on floor surfaces can usually be avoided because of the low heat capacity of Zonolite Insulating Concrete.

Zonolite Insulating Concrete is made by mixing a specially graded Zonolite brand of vermiculite with Portland cement. This insulating concrete can be placed directly on the ground (vapor seal often placed on ground first) forming a fireproof, rot proof, termite proof, vermin proof floor base.

## ADVANTAGES OF ZONOLITE

### PERMANENT.

ZONOLITE Insulating Concrete consists entirely of mineral or inorganic materials. It is not affected by destructive agents that limit its life or usefulness. Therefore it need not be replaced during the life of the building.

### INCOMBUSTIBLE.

ZONOLITE Concrete aggregate is processed at 2000°. IT CANNOT burn. Tests by the Underwriters' Laboratory on a floor construction incorporating ZONOLITE Insulating Concrete is given a four hour fire rating. This effectively protects against passage of heat and flame in case of fire.

### ROT PROOF.

Moisture has no effect whatsoever on the life of ZONOLITE Insulating Concrete. If, for any reason, it should become wet it will dry out without warping or buckling, retaining its original high insulating efficiency.

### VERMIN PROOF.

ZONOLITE Insulating Concrete provides no food or nesting material for vermin or termites, nor can they gnaw their way through it.

### LIGHTWEIGHT.

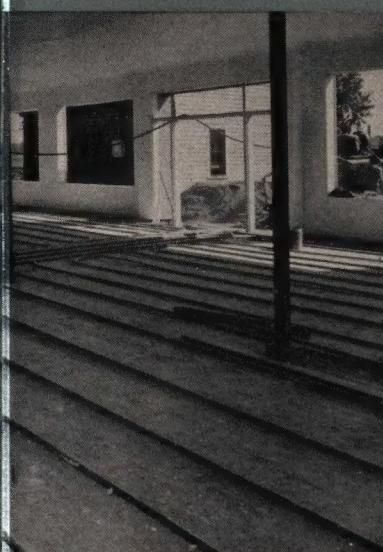
ZONOLITE Insulating Concrete weighs 1/7 as much as ordinary concrete or less than 2 pounds per square foot 1 inch thick.

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# ZONOLITE CONCRETE FLOORS

# G CONCRETE FLOORS

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Zonolite Insulating Concrete.



Covering radiant heat coils resting on Zonolite Insulating Concrete with topping of ordinary concrete.



\*Zonolite Insulating Concrete floor fill used in 35 story bank building.

## ZONOLITE CONCRETE FLOORS

### ECONOMICAL.

The first cost which is comparable to other insulating materials is the last cost because ZONOLITE Insulating Concrete is permanent.

### TIME TESTED.

Over 250 million board feet of ZONOLITE Insulating Concrete are giving satisfactory service throughout the world.

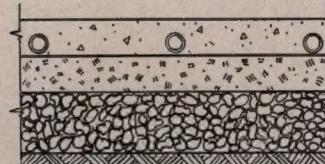
### HIGH INSULATING VALUE.

ZONOLITE Insulating Concrete has a high insulating value, one inch having a rate of heat transfer equal to 20" of ordinary concrete. It has sufficient crushing strength (from 5 to 20 tons per sq. ft., depending on the mix) to withstand all but the most unusual load conditions. A strong topping is necessary, however, to prevent marring due to highly concentrated loads of furniture, machinery, etc.

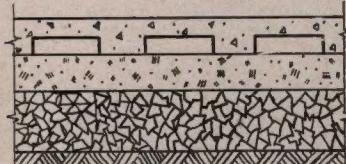
### WATER RESISTANCE.

As a result of chemical treatment of the aggregate at the time of manufacturing ZONOLITE insulating Concrete has a high degree of water resistance. Water will not rise or travel far through the concrete due to capillarity. Provision of a moisture barrier under the insulation is often desirable and frequently specified.

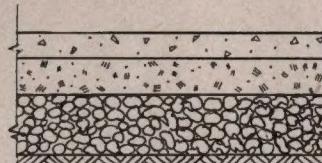
### TYPICAL FLOOR CONSTRUCTION USING ZONOLITE INSULATING CONCRETE



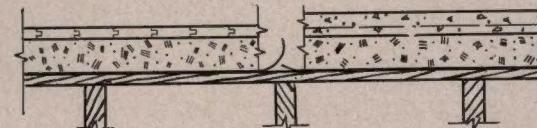
Radiant Heat Pipes in Floor



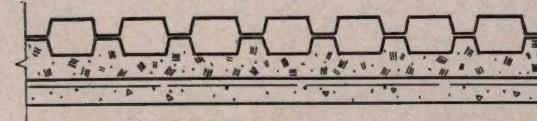
Radiant Heat Ducts in Floor



Zonolite Insulating Concrete Floor on Ground



Zonolite Insulating Concrete Over Wood Floor



Zonolite Insulating Concrete Over Cellular Steel Floor

NOTE: Due to printing error, this diagram is inverted.

\*The 35 story Mercantile National Bank Building in Dallas, Texas has 400,000 sq. ft. of Zonolite Insulating Concrete fill over steel pan floors. This greatly reduces the load of the building and makes it one of the most fireproof structures in the world. All ceilings, beams, and columns are fireproofed with Zonolite plaster. Write for details and for Underwriters' Laboratory report giving a four hour rating to ZONOLITE floor and ceiling construction.

## IDEAL BASE FOR RADIANT HEAT

ZONOLITE

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**MATERIALS:**

The Zonolite concrete shall consist of Stabilized Zonolite Concrete Aggregate, portland cement, and water; thoroughly and uniformly mixed.

The Zonolite shall be in expanded form weighing not less than 5 lbs./cu. ft., and not more than 10 lbs./cu. ft. It shall be so graded that at least 95% will pass a No. 3 sieve, and its 100-mesh fines content shall not exceed the ASTM standard specifications for concrete aggregate (C33-44). The aggregate received on the job shall have been chemically treated by the Zonolite producer in such a manner as to prevent segregation, insure uniformity, and reduce capillarity of the concrete, and only material so treated shall be acceptable. Portland cement shall conform to ASTM standard specifications C150-44.

Water shall be of potable quality.

**PROPORTIONING:**

The proportions of the above ingredients shall be .... bags of Zonolite stabilized concrete aggregate to 1 bag of Portland cement, unless otherwise specified. The mix shall be maintained uniform throughout

**SPECIFICATIONS****Zonolite Insulating Concrete**

the job. Sufficient water shall be used to produce a slump of not less than 6" and not more than 9".

\* See General Recommendations "Proportioning" below.

**MIXING:**

Mixing shall be accomplished in a mechanical mixer of a design proven suitable for mixing Zonolite concrete (plaster type with positive paddle agitation preferred). The period of mixing shall be limited to the minimum time which will accomplish complete uniformity and a flowable mixture, and this time of mixing shall be closely adhered to throughout the job.

**PLACING AND FINISHING:**

The Zonolite Insulating Concrete shall be transported and placed immediately after mixing is completed, and the period between completion of the mixing and placing shall be of such short duration that the mixture does not appreciably change in slump or consistency. Under no circumstances shall the use of mixtures, which have been delayed in placing until the consistency has changed, be allowed either with or without re-working.

The Zonolite Insulating Concrete shall be laid to the thickness and slopes conforming to the plans, and shall be finished to the smoothness desired as soon as the consistency is suitable. Rewetting and trowelling of the surface after the surface has set too hard for proper working shall not be allowed.

**CURING AND PROTECTION:**

The surface of the freshly finished Zonolite Insulating Concrete shall be prevented from drying out for not less than 3 days, or sufficiently long to allow the concrete to develop the desired strength. The curing shall start immediately following the initial set of the concrete if water-curing is used, and immediately following finishing if a spray-applied curing compound is used. In any case, the curing method used shall result in a firmly bound surface of satisfactory hardness, free from any friable or loose surface layer.

The Zonolite Insulating Concrete shall be protected from freezing during and after placing, or until such time as no harm results. The surface shall be adequately protected against damage prior to and during placement of the wearing surface.

**BASE PREPARATION**

The base shall be well drained, reasonably level, and sufficiently stable to support the superimposed loads without settlement. generally, a fill of five or six inches of coarse stone or gravel is desirable to stop the capillary rise of water from the ground. This should be thoroughly rolled and tamped to prevent settling.

Zonolite Insulating Concrete may be pored over new or existing structural bases that are clean and in sound condition. Over wood floors it is necessary to lay waterproof paper before pouring the Zonolite Insulating Concrete to prevent swelling and warping of the wood from the water in the concrete.

**MOISTURE BARRIER**

A moisture barrier is often desirable and frequently specified under grade level floors. Where one is required, it should consist of one or more saturated and coated felts with joints lapped and sealed. Generally the moisture barrier is applied under the insulation. Although the barrier can be applied directly on top of the stone fill, it is suggested that the fill first be prepared

**GENERAL RECOMMENDATIONS**

by spreading a weak mix of concrete or a dry mixture of sand and cement lightly over the surface in order to close the surface voids. This is wet with a light spray to add sufficient water to hydrate and set the cement. After this is set sufficiently, the surface is swept clean and the moisture barrier is applied as specified.

**PROPORTIONING**

For general purposes a mixture of 1 bag of Zonolite Stabilized Concrete Aggregate to 1 bag of Portland Cement is recommended. Where greater insulation is required, 2 bags of Zonolite to 1 bag of cement can be used, provided due care is taken to protect the insulation from abuse prior to placing the wearing surface. See table below for the physical properties of these two mixes.

**WEARING SURFACE**

A suitable wearing surface must be provided for all Zonolite Insulating Concrete floors to resist abrasion and highly concentrated loads such as furniture, machinery, etc. This wearing surface may be concrete, wood, magnesite, tile, etc., or a combination thereof. Any such material

used over Zonolite Concrete must be designed to safely distribute the superimposed loads without exceeding the compressive resistance of the insulating. Where the structural base under the Zonolite Insulating Concrete is a wood floor, or where the base is not absolutely rigid, the concrete wearing surface should be reinforced.

Where radiant heat pipes are laid over Zonolite Insulating Concrete, it is customary to cover the pipes with stone concrete to a thickness of one inch over the pipes. With other floors, one and one-half or two inches of concrete topping is recommended. The following proportions are satisfactory: one part Portland cement, two parts clean, sharp sand, three parts gravel or stone (minus  $\frac{3}{4}$  inch), and not to exceed six gallons of water per bag of cement. This must be kept moist for not less than three days for proper curing.

It is not generally recommended that asphalt tile or linoleum be applied to Zonolite Insulating Concrete without an intermediate topping of concrete or magnesite. Wood flooring can be nailed directly to sleepers embedded in the insulating concrete.

**PHYSICAL PROPERTIES****Zonolite Insulating Concrete**

Mix	(1-4)	(1-8)
Portland Cement (bags) .....	1	1
Zonolite Stabilized Concrete		
aggregate (bags) .....	1	2
(one bag contains approx. 4 cu. ft.)		
Water (gallons) .....	13	26
Density (lbs. per cubic foot) .....	34	20
K (70°) (BTU/hr./sq. ft./inch) .....	0.79	0.60
Crushing strength (lbs./sq. inch) .....	240	70
Crushing strength (lbs./sq. foot) .....	35,000	10,000



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